

"EXCHANGER PANEL FOR AIR CIRCULATION SYSTEMS AND SYSTEM
WITH SAID PANEL"

BACKGROUND OF THE INVENTION

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Field of the Invention

The present invention relates to an innovative exchanger panel for air circulation systems and a system having said panel.

10 State of the Prior Art

In air circulation systems in which the air in a room is exchanged with external air the problem caused by the different temperature and humidity conditions which might exist between the internal environment (usually controlled) and the external environment is known. For example, the internal air, which is heated or cooled to hold a desired internal room temperature, is replaced by new air at uncontrolled temperature which must in turn be heated or cooled. This involves an even substantial energy waste.

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The same applies to air humidity.

The general purpose of the present invention is to remedy the above mentioned shortcomings by making available an innovative exchanger panel for air circulation systems and a system with said panel which would allow in a simple and economical manner an exchange of humidity heat between flows of air input to and output from the room.

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SUMMARY OF THE INVENTION

In view of this purpose it was sought to provide in accordance with the present invention an exchanger panel
5 between two airflows comprising a layered structure formed of parallel leaves separated from one another by ribbings arranged alternately in two directions inclined to each other with the ribbings arranged in one of said two directions being designed to carry a first airflow between
10 the sheets and the ribbings arranged in the other of said two directions being designed to carry a second airflow between the sheets so that heat is transferred between the two airflows through said sheets.

Again in accordance with the present invention it was
15 sought to realize a system for air exchange between the interior and the exterior of a room in which suction means convey a first airflow from the exterior to the interior of the room and a second airflow from the interior to the exterior of the room and characterized in that along the
20 path of the two airflows it comprises an exchanger panel which comprises in turn a layered structure formed of parallel sheets separated by ribbings arranged alternately in two directions inclined to each other with the ribbings arranged in one of said two directions being designed to
25 carry the first airflow between the sheets and the ribbings arranged in the other of said two directions being designed to carry the second airflow between the sheets so as to exchange heat through the sheets.

BRIEF DESCRIPTION OF THE DRAWINGS

To clarify the explanation of the innovative principles of the present invention and its advantages compared with the prior art there is described below with the aid of the annexed drawings a possible embodiment thereof by way of non-limiting example applying said principles. In the drawings:

FIG 1 shows a diagrammatic perspective view of a piece of panel in accordance with the present invention, and FIG 2 shows a diagrammatic view of a system equipped with a panel having the structure shown in FIG 1.

DETAILED DESCRIPTION OF THE INVENTION

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With reference to the figures, FIG 1 shows diagrammatically an exchanger panel designated as a whole by reference number 10. The panel comprises a layered structure made up of parallel sheets 11 separated from each other by ribbings 12, 13 arranged alternately in two directions 14, 15 inclined to each other.

The ribbings arranged in one direction are designed to carry a first airflow between the sheets while the ribbings arranged in the other direction are designed to carry a second airflow between the sheets. In this manner the airflows are kept effectively separated from each other. The two directions are advantageously at right angles to each other. Again advantageously, the two directions are at right angles to respective panel end sidewalls of which are

the inlet and outlet of said airflows. Several panels can be juxtaposed in the various directions to realize a modular assembly of any size.

As may be seen well in FIG 1, the ribbings between facing
5 sheets are advantageously realized by means of a continuous undulated wall to extend in zigzag manner between the two sheets. The undulation can be in a broken line or in a more or less continuous curved line. The continuous undulation as shown in the FIG was found preferable for the practical
10 embodiment of the panel with reduced cost.

The sheets are permeable to allow not only heat exchange between the airflows but also a certain exchange of humidity. In the realization of the panel it was found particularly advantageous to use cardboard both for the
15 separating sheets and the ribbings. The cardboard can be stiffened with appropriate known resins to give them increased adequate structural stiffness and resistance to humidity without excessive softening while at the same time keeping the transpiration through the wall. The ribbings
20 can be advantageously glued between the sheets.

Thus is achieved a very economical panel suited to disposable use meaning that it can be replaced at little expense with the frequency necessary to always have excellent yield. For example, once the passages are
25 excessively clogged with dust and dirt, the panel can be replaced as though it were a normal disposable filter.

In addition to a barrier for deposits entrained by the airflow the panel in effect constitutes an effective filter for cleaning of the humidity traversing the sheets.

FIG 2 shows diagrammatically a system 16 for air exchange between the interior and the exterior of a room. The system comprises suction means 17, 18 that convey a first airflow from the exterior to the interior of the room and a second
5 airflow from the interior to the exterior of the room. Along the path of the two airflows is arranged a panel 10 as described above in such a manner that heat and humidity are transferred between the two airflows through the panel. Naturally, ducts known in themselves and therefore not
10 shown can be provided for distribution and/or suction of the flows in the room and for their correct passage through the panel.

It is now clear that the predetermined purposes have been achieved. A panel and a system therewith were found highly
15 effective for air exchange between two rooms. In particular, use in animal farms was found particularly advantageous.

Naturally the above description of an embodiment applying the innovative principles of the present invention is given
20 by way of non-limiting example of said principles within the scope of the exclusive right claimed here. For example the number of layers and waves or ribbings for each layer can vary depending on the specific requirements and rate of airflow desired. The size of the waves or ribbings can vary
25 depending on the dust and dirt content it is expected to find in the airflows traversing the panel.